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FOURTEENTH ANNUAL REPORT OF THE DIRECTOR.

SUBMITTED TO THE TRUSTEES JANUARY 14, 1903.

To the Board of Trustees of the Missouri Botanical Garden:

The following report on the Missouri Botanical Garden and the Henry Shaw School of Botany, therewith connected, is respectfully submitted in compliance with the rules of the Board.

THE BOTANICAL GARDEN.

The general maintenance of the Garden during 1902 has not differed in essentials from what has been reported for preceding years. Perhaps the most marked change was at the main entrance, where the provision of climbers on the inner face of the gate house and the growth of a heavy mass of *Acalypha tricolor* flanking the entrance walk produced an impression quite different from that effected by the use of succulents about the gate house for a number of years.

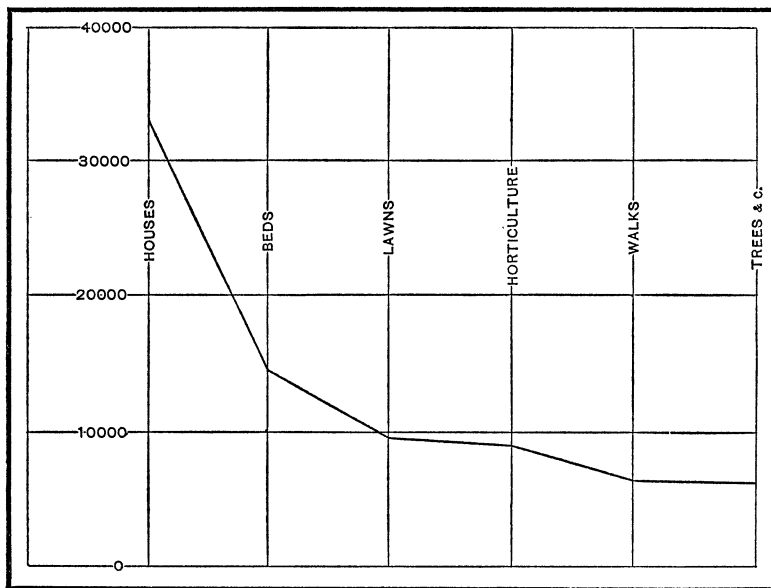
In contrast with the preceding summer, that of 1902 was relatively cool and moist, so that although some of the plants set in the autumn and a number of the trees enfeebled by the drought and heat of 1901 died, the general operations of gardening were satisfactorily and effectively carried on.

The apportionment of labor in the different departments of gardening is clearly shown on the accompanying diagram (A), compiled from a tabulation which is made at the end of each month from the daily reports of the gardeners. The care of the decorative collections sheltered in green-houses requires almost one-half of the entire labor annually expended on gardening, the flower beds and ponds — which receive little attention in winter — requiring not far from one-sixth of the total, lawns and horticulture — the latter



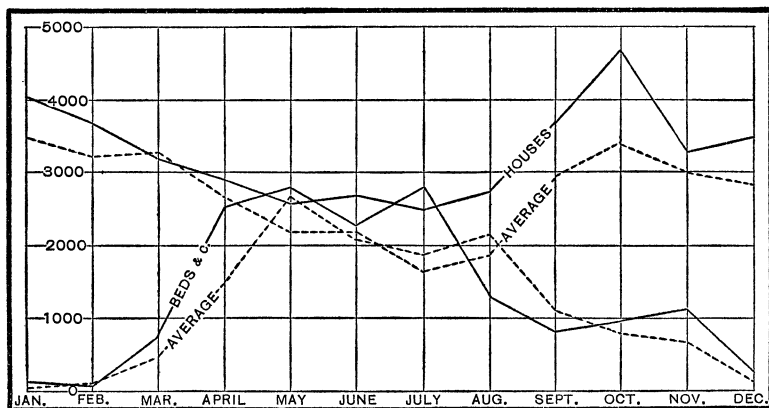
SOTOL—*DASYLLIRION SERRATIFOLIUM*.

DIAGRAM A.



HOURS OF GARDENING LABOR, 1902.

DIAGRAM B.



LABOR ON HOUSES AND BEDS — BY MONTHS.

including work in the vegetable house — somewhat more than one-eighth each, and the walks and the collections of woody plants a little over one-twelfth each. The seasonal distribution of hours of labor respectively on plant houses and frames, and on beds, ponds and rockeries, for 1902, with corresponding averages for the preceding five years, is graphically presented in diagram B.

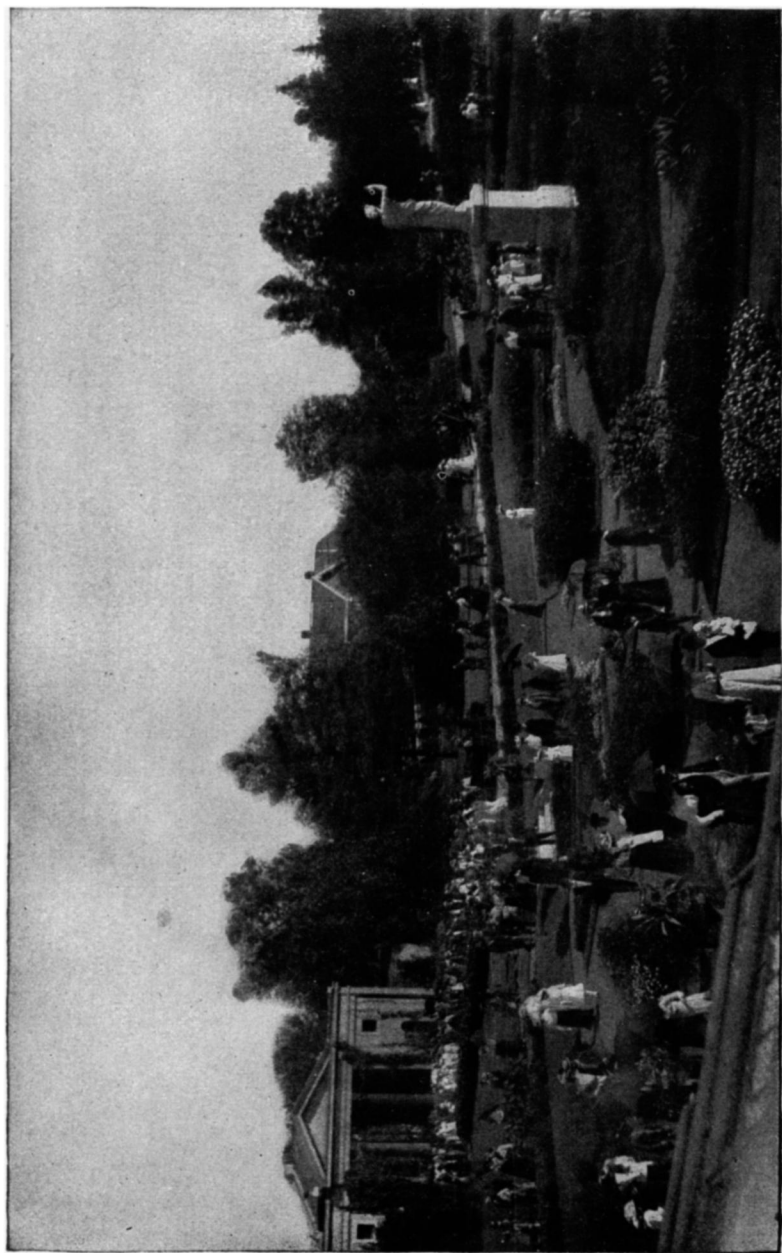
The border of trees and shrubbery of the recently graded tract at the southern end of the Garden again suffered to an unexpected degree last winter, but the lost trees have been replaced, and it is hoped that in the coming season the planting of the North American synopsis may be completed in large part in this tract. Though gravel walks will ultimately be carried through this addition to the grounds, it is the intention for the present to maintain in it turf walks only, and a fairly good bluegrass sod has already been established on much of the tract.

Toward the end of last winter a fire originated in one of the temporary flue-heated plant-houses, damaging the house and destroying or injuring its contents, and in the early autumn, glass, somewhat in excess of 1,100 square feet in area, was broken by hail. The loss in both cases was fortunately light.

Among the additions and improvements made during the season should be noted the provision of a series of plant-houses of modern design and good construction, for the growth of plants needed for display in the houses which are open to the public, — the results of which are already very noticeable in the latter, — and for the propagation of bedding plants.

During the year, 128 species or varieties of plants were dropped from cultivation, and 1,712 were added, making a net gain of 1,584 for the year,* the total number recorded

* See Rept. Mo. Bot. Gard. 13:18.

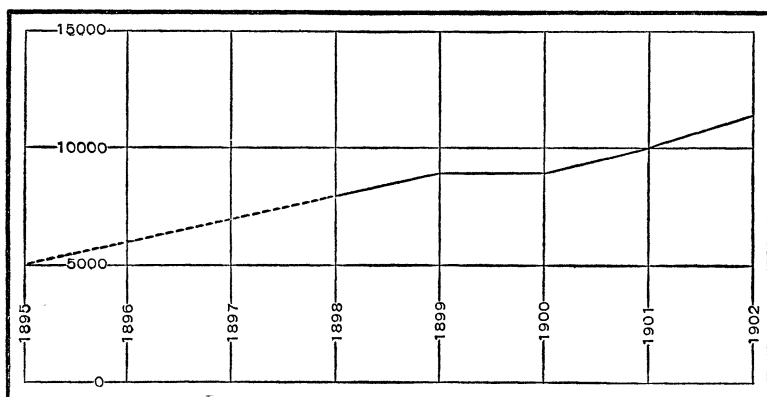


SUNDAY VISITORS.

as cultivated now being 11,551. The yearly increase in the variety of plants cultivated is shown by the appended diagram (C). An estimate, only, was made prior to 1898, since which records have been kept.

The policy of giving surplus plants to hospitals, schools, etc., has been continued, and 2,020 plants were distributed in this manner in 1902. In addition to this, 392 plants,

DIAGRAM C.

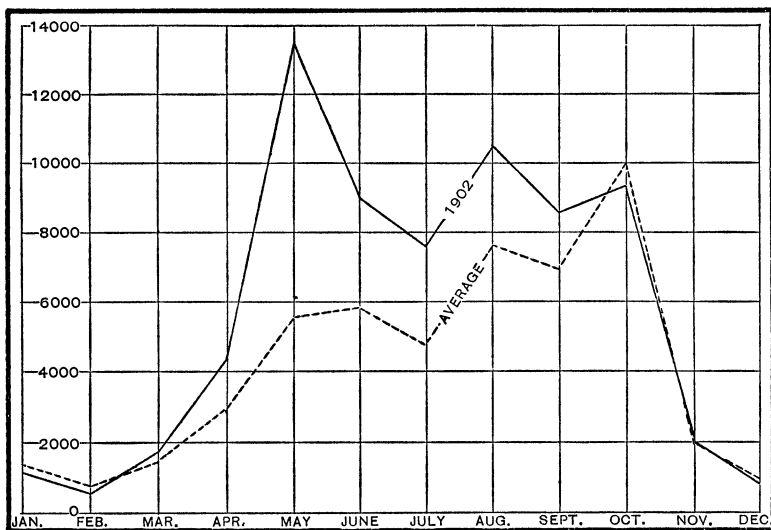


SPECIES AND VARIETIES CULTIVATED.

cuttings, or packets of seeds, valued at \$64.95, were sent to correspondents of the Garden. In exchange for this material and the publications of the Garden, or as gifts, 11,613 plants or packets of seeds, valued at \$867.07, were received. The employees of the establishment propagated 13,286 plants, valued at \$930.02, and collected 311 plants or packets of seeds, valued at \$36.31; and 7,737 plants or packets of seeds were bought, the expenditure for these, as shown by the Secretary's books, amounting to \$1,327.66.

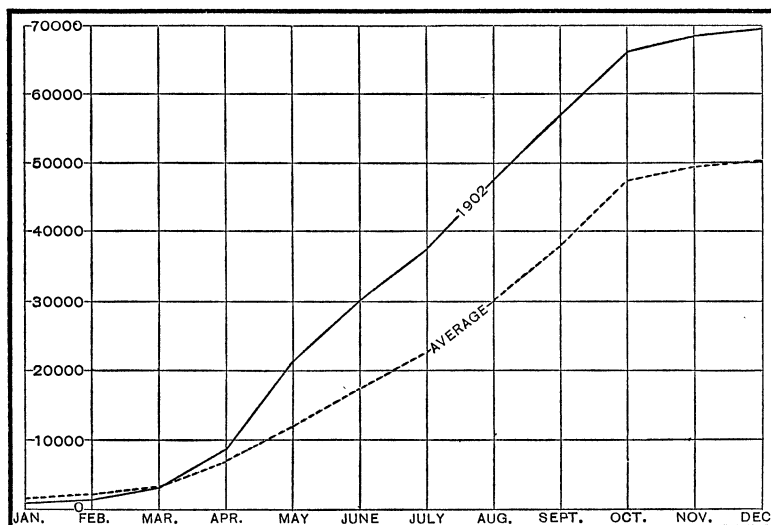
The number of visitors in 1902 was 21,052 greater than in the highest previous year (1901) for which records have been kept, reaching a total of 112,314, of which number 20,550 were recorded for the open Sunday after-

DIAGRAM D.

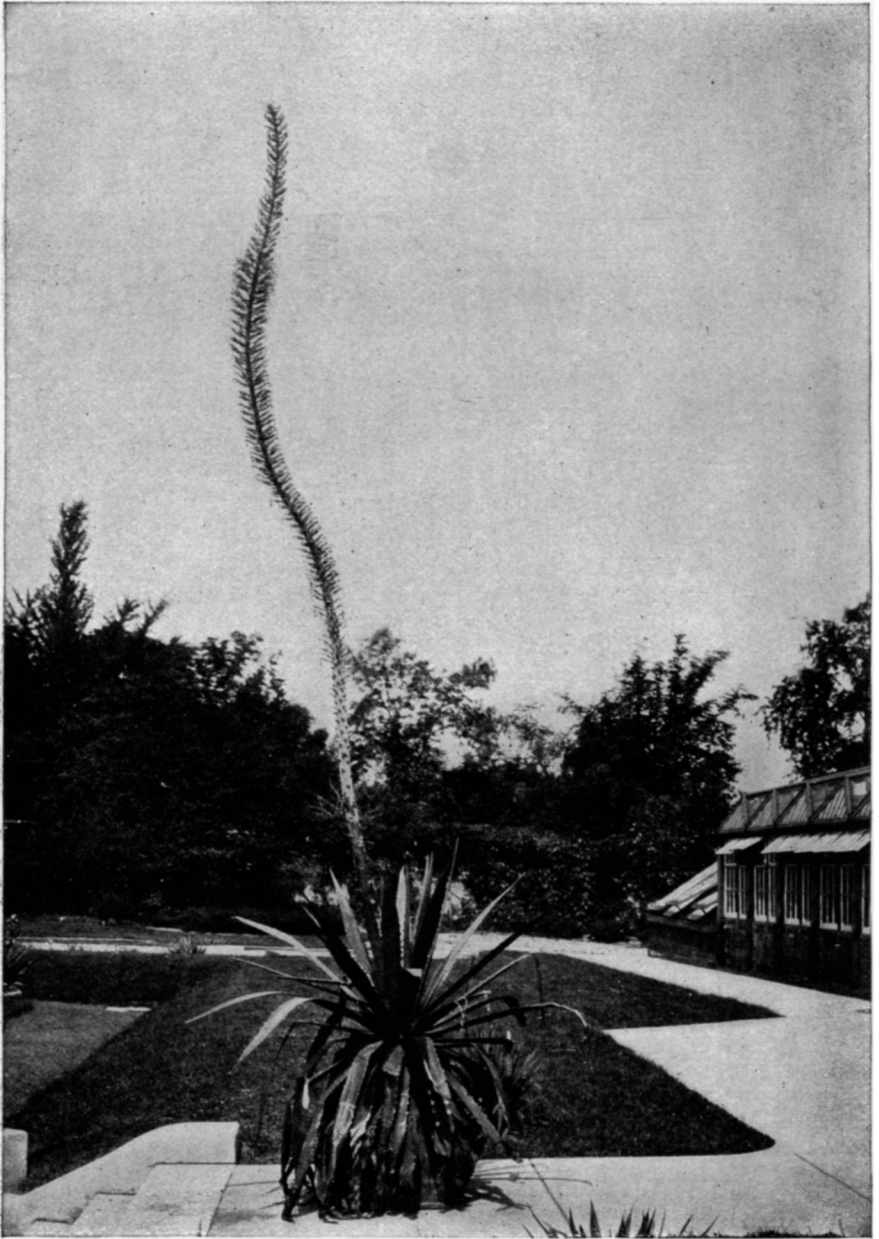


VISITORS ON WEEK DAYS—BY MONTHS.

DIAGRAM E.



VISITORS ON WEEK DAYS—CUMULATIVE.

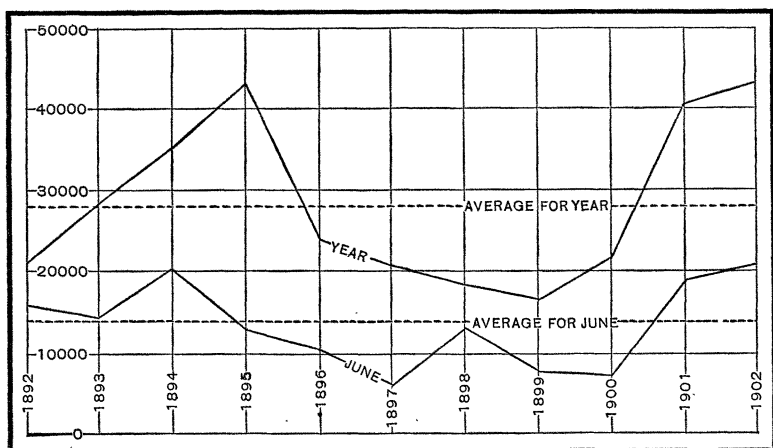


FLOWERING AGAVE—A. TONELIANA.

noon in June, and 22,667 for the open Sunday afternoon in September, — both surpassing earlier records for the corresponding days. The distribution of week day visitors through the year is shown by the full line on the appended diagrams (D, E.), in comparison with which the average for the preceding years covered by records is indicated by a dotted line. The striking rise in the curve in May is due to the fact that an *Agave* (*A. Toneliana*) which flowered at that time was taken notice of by the daily papers, so that more than the usual interest in the Garden was awakened, and this interest evidently persisted through several ensuing months.

The comparison of the number of Sunday visitors in 1902 with the average for earlier years is facilitated by the diagram F.

DIAGRAM F.



SUNDAY VISITORS.

The herbarium has received more than the customary attention during the year just closed. Most of the current collections of American plants and some foreign sets have been purchased, and the Garden was fortunate enough

to secure the herbarium of Professor G. C. Broadhead, valuable as verifying the occurrence in Missouri of plants referred to in the early geological reports on the State. Though large additions to the mounted material have been reported each year, the herbarium has been increasing far more rapidly than the material could be mounted and incorporated. Extra help has been employed through nearly the whole of 1902, in which 62,844 sheets of specimens were incorporated, leaving a greatly reduced quantity of unmounted material at the close of the year. Of the incorporated sheets, 15,551, valued at \$757.55, were presented or received in exchange for material or publications, 469 were collected by employees of the Garden, and 47,224 were bought. The expenditure on the herbarium for the year amounts to \$3,015.81. A single duplicate sheet only was withdrawn, but a considerable amount of fragmentary material of no nominal value was sent to correspondents for research purposes.

The herbarium, so far as now mounted, consists of: —

The Engelmann Herbarium (all groups) about . . . 97,800 specimens.

The General Herbarium: —

Higher plants.

The J. J. Bernhardt Herbarium	61,121	
The J. H. Redfield Herbarium	16,447	
The Sturtevant and Smith Herbarium	7,446	
The Gustav Jermy Herbarium	4,172	
Other specimens	209,122	298,308 “

Thallophytes.

The J. J. Bernhardt Herbarium*	126	
The Gustav Jermy Herbarium	1,659	
Other specimens.	29,904	31,689 “

Making a total of 427,797 “

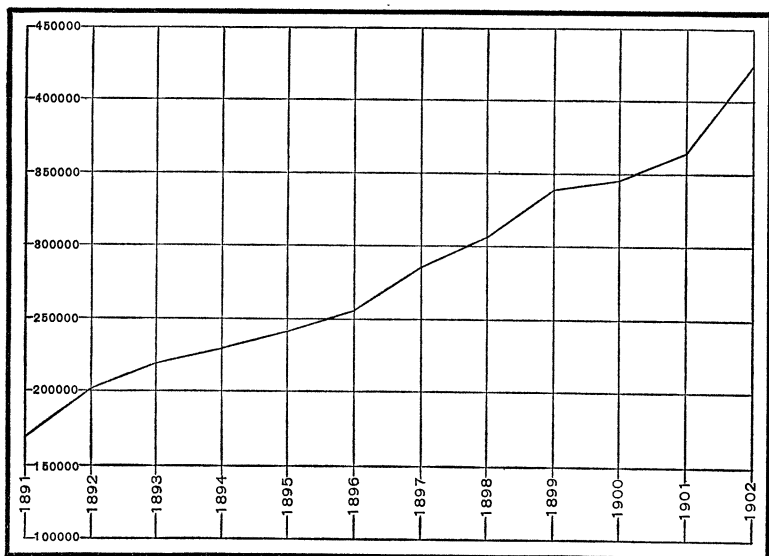
Valued at \$64,169 55†

* So far as yet incorporated.

† This valuation, at the rate of \$15.00 per hundred mounted sheets.

The yearly growth of the mounted herbarium is shown in the diagram G.

DIAGRAM G.



SPECIMENS IN HERBARIUM.

The following, practically a part of the herbarium, remains unchanged: —

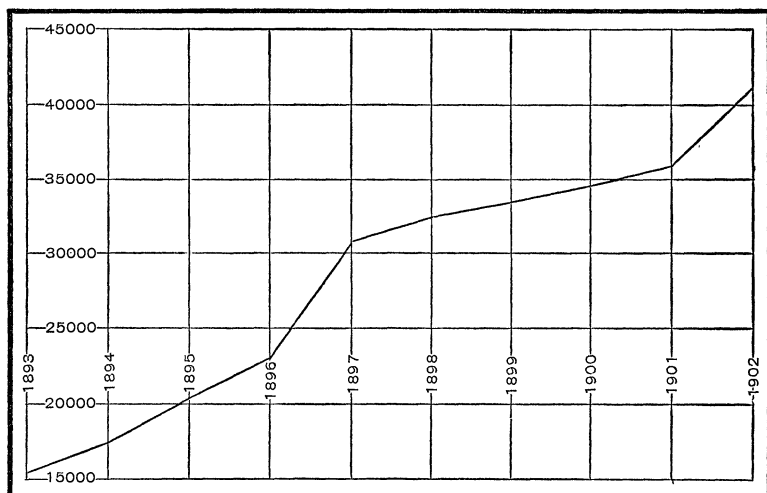
Wood specimens of various sizes	1,027, valued at \$100 00
Wood veneers by Hough and others	2,279 " 160 00
Microscope slides by Penhallow and others	<u>1,051 " 250 00</u>
Together	4,357 " \$510 00

The library has been increased by the addition of 1,524 books and 697 pamphlets, purchased, and 992 books and 1,995 pamphlets, valued at \$2,058.89, presented or received by way of exchange. The expenditure for books, binding and pamphlet covers amounted to \$5,142.16. Among the notable additions to the library should be mentioned an extensive collection of books published prior to the time of Linnaeus, and therefore complementary to the pre-Linnean library presented by Dr. Sturtevant in 1892.*

* Rept. Mo. Bot. Gard. 4:14. 8:21.

The yearly increase in the number of books and pamphlets in the library is shown on the diagram H.

DIAGRAM H.



BOOKS AND PAMPHLETS.

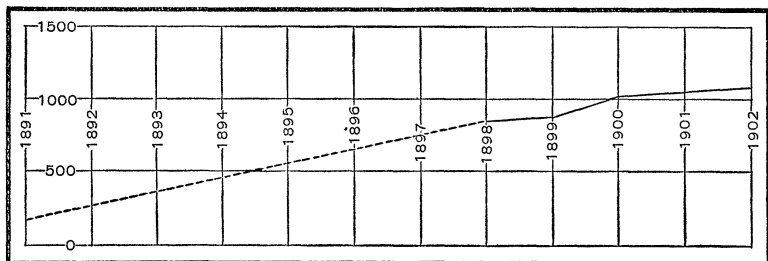
The card index was increased by the addition of 27,471 new cards, of which 2,724 were bought, at a cost of \$27.86, 3,768 were presented, and 20,979 were written by employees.

As now constituted, the library contains: —

Pamphlets	. . . . .	22,608			
Books	. . . . .	18,550			
			41,158	valued at	\$66,706 30
Manuscript volumes	. . . . .	66		" "	800 00
Total	. . . . .	41,224		" "	\$67,506 30
Index cards	. . . . .	302,955		" "	3,029 55
Total valuation of library	. . . . .				\$70,535 85

The current list of serial publications received includes 1,160 titles, of which 92 represent purchases, and 1,068, issued by 817 institutions or publishers, exchanges. The yearly increase in exchange publications received at the Garden is shown by the diagram I.

DIAGRAM I.



PUBLICATIONS RECEIVED BY EXCHANGE.

During the year, 183 copies of the little handbook were sold, and a considerable number were given away, principally to representatives of the press, entertained in St. Louis by the World's Fair management.

The third and eighth volumes of the Garden Reports, the edition of which had become exhausted, have been reprinted from the original electrotypes, 500 copies of each being secured.

The following changes in the personnel of the office have been made in 1902: Mrs. A. E. Ford was appointed stenographer in place of Mr. C. E. Hutchings, who had filled that position for a long period of years, and Miss Eva Perles was appointed as an assistant in the library. Too much cannot be said in commendation of the efficiency of Mr. Irish, under whose immediate care the new plant-houses were built, on plans designed in detail by him, and of Mr. Harris, to whose energy the clearing up of accumulated material in the herbarium was chiefly due.

As has long been the policy of the Garden, research

work has been carried on by all of the higher office employees, each of whom has been permitted to devote a regular, if not large, part of his time to investigation. Some of the results of this study have been published already, and others, particularly a revision of the varieties of peaches cultivated in the United States, by Mr. Irish, will be printed in the near future. For the completion of my own paper on Yuccas and related plants, published in the thirteenth Garden Report, two rapid field trips were undertaken in the early part of the year, covering parts of Guatemala, Honduras, Mexico, and the southwestern United States.

Visiting botanists and scientific correspondents have been given every possible aid in their studies, and a number of candidates for advanced degrees in Washington University have been occupied in resident work at the Garden. The investigation of the diseases of plants and the decay of timber, by Dr. von Schrenk of the School of Botany and his assistants, has been continued for the United States Department of Agriculture through the year, and a portion of the old museum building has been adapted to office and laboratory use in the prosecution of this work.

One garden pupil, Rudolph J. Mohr, who had completed the prescribed course of study and was recommended as practically proficient by the Head Gardener, was admitted to examination and granted the prescribed certificate in April, and the scholarship vacated by him was awarded to William Polst, of St. Louis, on nomination of the St. Louis Florists' Club. One paying pupil, Miss Herta A. Toeppen, has taken the regular gardening course through the year, in addition to the six pupils holding scholarships.

Three annual events, provided for in the will of the founder of the Garden, have taken place, as follows: —

The annual flower sermon was preached in Christ Church Cathedral, St. Louis, on the morning of May 18, by the Right Reverend George H. Kinsolving, Bishop of Texas.

The banquet to the Trustees of the Garden, and their guests, was given at the Southern Hotel, on the evening of May 17th. Bishop Tuttle, of the Board of Trustees, presided. Covers were laid for 99 persons, among whom were the Trustees of the Garden, representative citizens of St. Louis, and a number of prominent educators and investigators from a distance. Speeches appropriate to the occasion were made by Dr. E. A. Birge, Acting President of the University of Wisconsin, Professor J. A. Holmes, State Geologist of North Carolina, and Messrs. Smith P. Galt and W. M. Reedy, of St. Louis.

The thirteenth banquet to the gardeners of the institution and invited florists, etc., was given on the evening of November 19th, at the Mercantile Club. In the absence of the Director, who was unable to be present, Mr. H. C. Irish, his Horticultural Assistant, presided. One hundred and ten persons were present, including, in addition to the gardeners and office staff, a number of representative florists, nurserymen, market gardeners and amateurs, as well as a large number of the gentlemen in attendance at the American Apple Growers' Congress, then in session at St. Louis. Dr. John Green, of the Board of Trustees of the Garden, officiated as toast-master and the following toasts were proposed: The American Apple Growers' Congress, response by Mr. Charles H. Williamson, of Quincy, Ills.; The Garden Pupils, response by Professor A. T. Erwin, of Ames, Ia.; Professional Men as Orchardists, response by Mr. Albert Blair, of St. Louis; The Plant Pathologist, response by Dr. H. von Schrenk, of St. Louis; The St. Louis Florists' Club, response by President J. W. Dunford, Jr.; The American Pomological Society, response by President C. L. Watrous; Our Forests, response by Dr. Tarleton H. Bean, of the World's Fair; Horticulture at the Exposition, response by Mr. F. W. Taylor, of the World's Fair; Henry Shaw, response by Mr. F. N. Judson, of St. Louis.

It may be worthy of mention, as showing the influence of these gatherings, that, partly as a result of the discussion at the preceding banquet,* much interest has been awakened in the beautification of St. Louis homes by the use of growing plants, a matter energetically taken up by the Engelmann Botanical Club and indorsed by the subsequently organized Civic Improvement League. As a result of these efforts, over 70,000 packets of flower seeds were sown by school children alone last year, and there is reason to believe that the activity of both children and parents will be increased the coming season.

The provision in Mr. Shaw's will for the award of premiums or prizes at a flower show when held in St. Louis, was not taken advantage of in 1902, for the only time since the first flower show was held, no flower show being held in the city last year.

THE SCHOOL OF BOTANY.

The staff of the School of Botany remains unchanged since my last report.

With the purpose of better adapting the work of the department to the general needs of the University, the series of electives in botany offered to undergraduates† was considerably shortened and simplified in the spring, the courses as now offered being as follows:—

- 1, 2. Elementary Morphology and Organography. — Laboratory work, with supplementary lectures and quizzes, dealing with the form and structure of plants with special reference to their life processes, and to systematic botany.
- 3, 4. Cytological Technique. — Laboratory work in the cultivation and examination of bacteria and the methods of histological investigation, combined with a study of the principal types of plant anatomy, — specially adapted to the needs of students intending to study medicine.

* Rept. Mo. Bot. Gard. 13 : 25.

† Rept. Mo. Bot. Gard. 12 : 19.



SPECIMEN PALM—*LICUALA GRANDIS*.

- 5, 6. Vegetable Physiology. — Laboratory work, with supplementary lectures.
- 7, 8. Systematic Botany. — Laboratory and field work, with supplementary lectures, dealing with the comparative structure and the classification of plants.
- 9, 10. Plant Pathology and Applied Mycology. — Laboratory work.

The first two of these courses, for beginners, are intended, as nearly as may be, to furnish an equivalent of the desired standard option in botany for admittance to colleges; the third and fourth are rather in technique than botany proper; and the remaining six are for students who have had preliminary training. In addition to these stated electives, suitable advanced work is offered for undergraduates or graduates prepared to undertake it, and one candidate for the Master's degree, and four candidates for the Doctor's degree, in botany, are now enrolled in Washington University.

Very respectfully,

WILLIAM TRELEASE,

Director.